

GEOSPATIAL STRATEGY FOR NATIONAL DEVELOPMENT

Indian Geospatial Market, Economy, Policy Impact Analysis
and Geospatial Industrial Development Strategy



Produced by

**GEOSPATIAL
WORLD**
ADVANCING KNOWLEDGE FOR SUSTAINABILITY

CITATION GUIDELINES

- All use of GW Consulting is subject to our review and approval (except for the press and clients in limited form) on a case-by-case basis.
- Geospatial World reserves the right to change these guidelines at any time without notice.
- These guidelines are for general informational purposes only. Geospatial World reserves the right to deny any and all uses of the GW Consulting for any reason at any time.

Important Note About Using the Company Name

- Geospatial World should be cited as " Geospatial World Analysis" on each mention.

What Requires Geospatial World's Approval?

- All external or commercial citation of Research and Custom Research, including without limitation:
- Uses of the Research in advertisements, press releases, and sales collateral in any medium.
- Uses of the Research in SEC filings or other legal documents.
- Links to any websites maintained by Geospatial World and/or its subsidiaries.
- All full reproductions and/or distributions of the GW Consulting. Geospatial World prohibits this type of use unless reprints are purchased from Geospatial World or the client has express written permission.
- All promotion, distribution, and reuse of Geospatial World content, including any use of the Geospatial World logo, trademarks, or service marks, through any third party in all types of media.
- If a client or a third party is unsure about a particular use, seek our approval before making the citation.

How to Seek Geospatial World Approval

- Email us at info@geospatialworld.net
- Provide the full citation and context for your request.
- Please include a draft copy of any press releases and other marketing materials, such as newsletters, email campaigns, direct mail, etc.

© GEOSPATIAL MEDIA AND COMMUNICATIONS COPYRIGHT 2022

All Geospatial Media and Communications reports are subject to a standard disclaimer.

(1) The views and opinions expressed here are purely discrete perspectives of Geospatial Media and Communications and do not state or reflect the views of the patrons or partners.

(2) Reasonable efforts have been made in preparation of this report. The information in this report is based on thorough analysis and understanding of the subject as Geospatial Media and Communications strives to be accurate in its study & findings.

(3) While reasonable care has been taken in the preparation of this report, all information, assumptions, research and recommendations herein are published, given, made, or expressed without any responsibility of Geospatial Media and Communications, whether arising by way of negligence, breach of contract, breach of statutory duty or otherwise.

(4) This disclaimer shall apply to liability to any person whatsoever, irrespective of such liability arises, whether by use of this report by that person or you or any other person or otherwise.

(5) Geospatial Media and Communication, its directors, employees, agents, consultants, successors in title, shall be indemnified against any claim made against any or all of them by third-parties arising out of the disclosure of the report, whether directly or indirectly, to a third party.

(6) All content in this report are that of Geospatial Media and Communications and is protected. Any other use, including the reproduction, modification and distribution, transmission, republication, display or performance, of the content in this report without written from all parties involved is strictly prohibited.

TABLE OF CONTENT

FOREWORD	4
Key Contexts	6
Integrated Development Planning	6
Technology Integration and Digital Transformation	7
India's Geospatial Readiness.....	7
Indian Geospatial Industry Ecosystem	11
Geospatial Industry – SWOT Analysis	12
The Indian Geospatial Market	14
Indian Geospatial Market: By Business Offerings.....	16
Indian Geospatial Market: By Sectoral Market Share.....	16
Indian Geospatial Economy 2022	18
Policy Impact and Implications	20
Impact of Guidelines of Geospatial Data and Drone Rules	20
Benefits of Guidelines Foreseen Over 18 Months	21
Impact of Policy to Enhance Adoption of Geospatial Technology across Sectoral Workflows.....	22
Geospatial Economy: Impact	23
Revised Policy Impact Forecast	23
Revised Geospatial Industrial Development Strategy Impact Forecast.....	24
Next Step Forward -	25
India Geospatial Industrial Development Strategy	26
Factors to Grow the Indian Geospatial (including Space) Market.....	29
Acknowledgement	30

FOREWORD



SANJAY KUMAR
Founder and CEO
Geospatial World

With Opportunity Comes Responsibility – Winston Churchill

The pandemic is behind us, and we are learning to deal with its impact on health (mental and physical), work environment, geo-political order, economy, and society. The pandemic has been a transitioning force that has caused a tectonic shift in our behavior. And, sooner or later, we as humans must deal with a reality check of the ‘new normal in terms of economy, society, and environment. I have been traveling extensively in the last two and half years and can vouch that we live in a absolute diverse world, having different sets of experiences and ideologies driven by individual capacities and outlooks.

Undoubtedly, the pandemic accelerated digitalization, pushing humanity into the 4th industrial age, and setting new parameters and determinants of sustainability and growth. While the world economy experienced negative growth across almost every fundamental industry during the pandemic, the IT industry kept growing both in revenue and profitability. Today, the IT industry is leading the narratives of likely slowdown and recession, sounding alarms and caution through firings and restrictions.

India has charted its path of building ‘self-reliance’ and ‘rightly so, as we are not only the largest democracy but the largest populous country in the world now. And we, as a nation, have the responsibility to provide an equitable and sustainable living to our citizens. The Government of India has been undertaking reforms across almost every sector that supports our mission of improving the quality of living, be it technology innovation and policies, investments in physical and digital infrastructure, the transformation of institutions, and greater participation of the private sector.

The Geospatial and space industry, which has been gaining momentum and serves as the foundation for digital infrastructure and economy, has been recognized as enabling and driving force toward our mission of self-reliance. Though the current share of the geospatial, space, and drone industry in the Indian economy is almost negligible, but rightly so, these sectors have been identified as sunrise industries, offering massive potential in themselves, as well as enabling contributions towards India’s vision of 10 trillion economy. However, progress made in the last 30 months, ever since the announcement by the Hon’ble Finance Minister in June 2020 with reference to reforms in space and the geospatial sector, doesn’t match with narratives and rhetoric.

Though there is a lot of buzz and excitement amongst stakeholders of the geospatial and space industry, the same is inevitably going through the reality check and market corrections and

shifting away from being over-reliant on hypes and narratives. There are a few exceptionally successful examples, but overall excitement and enthusiasm have been watering down across most stakeholders, slowing down growth projections. While industry performance did come very close to the predicted geospatial economy of 38,972 crores during the financial year 2021-22, but growth potential for the year 2022-23 has reduced substantially (6% CAGR only) and is estimated to be 41,760 crores, and even the future growth potential up to 2025 is likely to slow down through market corrections as against our initial estimation in 2021.

Watering down impact has primarily been caused by policy paralysis and institutional reluctance towards commercialization and industrialization of geospatial and space industries. Its been 18 months since the Government of India brought in Geospatial Guidelines, and till date, we don't have final policy. Though, geospatial guidelines are technically enforced, their implementation is impeded due to the absence of formal policy, though further causes uncertainty for the larger user and business community and large users across government and business communities.

The space sector that offers a bigger pie of opportunity, has been undergoing the worst of its kind uncertainties wherein commercial sector doesn't have clarity on policy, and so as space institutions don't have clarity of direction. And put together, its nothing but a chaotic phase, resulting in an overall slowdown. One may argue that this is part and parcel of transitional transformation. But at the same time, the fate of space and the geospatial industry that provides a foundation for the modernization of India (as narrated by the highest leadership) can't afford to be determined by prolonged delays and uncertainties. We need well-crafted and steered integrated geospatial and space policy duly augmented by investments in foundational infrastructure and handholding of the commercial sector to move up the value chain through long-term contract Research and Development programs.

Having said so, it's very heartening to note that Indian geospatial entrepreneurial leadership have been showing phenomenal resilience and sustainability on their own and have charted path of innovation, productization, integration of workflows, capacity development, and scalability of applications and amplification of impact in national development.

Geospatial Artha Report has estimated a visible shift in terms of Indian geospatial and space companies moving up the value chain and delivering quality and state-of-the-art products and solutions. A host of space startups have secured investments and demonstrated unparalleled progress across upstream and downstream markets. And so as a number of geospatial companies have strengthened their financial and technology capabilities to build platforms and portals powered by high resolution and precise content, creating and nurturing markets for infrastructure, energy, land and property, water resources, networks and utilities, and business enterprises.

I am sure that the findings presented in this report will bring a wealth of information and insight to the various stakeholders of the geospatial ecosystem and provide policy-makers and decision makers with insights to address the growth potential of the Indian geospatial industry, and the technology innovations which will help in fulfilling India's vision of a five trillion dollar economy.

KEY CONTEXTS

Integrated Development Planning

Over the years, India's contribution to global economic growth and progress in development has been steadily rising, so much so, that India is today the fifth largest economy in the world, surpassing the United Kingdom with a US\$ 3.2 trillion in GDP. The country is projected to be the world's second-largest economy (behind only China) by 2050. From a geopolitical perspective, India has the seventh largest land mass in the world, with a total area of 3,287,263 square kilometres, land boundaries spanning 15,200 km, and a coastline of 7,516.6 km. India is the world's largest democratic republic comprising 28 States and eight Union Territories with a population of 1.417 billion – set to rise to 1.515 billion by 2030, making it the most populous country in the world.

Over the past couple of years, India has recognized the complex mix of challenges the economy faces, taken strategic measures to improve its socio-economic performance, and addressed the challenges it faces to meet its growth and development goals. Most of the challenges the country faces today are associated with multi-layered economic issues and a vast diversity of geo-political and economic-driven challenges. For India to overcome the multitude of challenges, the country's political leaders have strategically visualized and conceptualized a five trillion-dollar economy vision of 2025, adopting a comprehensive approach while designing various programs and considering the inter-relations among the various subsets and issues of appropriate technology integration mechanisms.

Further, on closer scrutiny of the current economic scenario, the export and import imbalance, the trade deficit, the planning and implementation of strategies within the country focuses on making India **'Atmanirbhar'** or **'Self-reliant'**, under the **'Make in India'** initiative, while simultaneously ensuring digital transformation as the key to solve issues about socio-economic development. For countries to appropriately deliver coordinated, collaborative and technology-integrated services, the concerned government ministries and agencies have formulated national mission mode programs, projects, and policies, which cut across economic, social, and environmental areas and various sub-sectors and activities for effective results on the ground.

In perspective, today, the national planning in the country is visibly taking cognizance of the **need for an integrated approach instead of a piecemeal approach** for effective planning and execution. The integrated approach sets an aspirational vision and is helping the country to establish distinguished and distributed delivery structures for implementation. Some recent examples of such initiatives include the following –

- **National Infrastructure Pipeline** - a collection of projects and programs totaling INR 102 lakh crore in infrastructure development over five years to power businesses, create jobs, enhance living conditions, and give equitable access to infrastructure for all, making growth more inclusive.
- **PM GatiShakti National Master Plan (PMGS-NGP) – National Master Plan for Multi-modal Connectivity** - essentially a digital platform that brings together 16 Ministries, including Railways and Roadways, together, for integrated planning and coordinated implementation of infrastructure connectivity projects. The Plan is expected to facilitate the last-mile connectivity of infrastructure projects and reduce travel time for people.
- **National Logistics Policy** - a comprehensive effort to address issues of high cost and inefficiencies by laying down an overarching interdisciplinary, cross-sectoral, and multi-jurisdictional framework for developing the logistics ecosystem.
- **Digital India Initiative** - inclusive of 44 mission mode projects (MMPs), is a flagship program of the Government of India with a vision to transform India into a digitally empowered society and knowledge economy.

These national initiatives include bringing suitable central and state level coordination and execution structures, Special Purpose Vehicles (SPVs) demonstrating a shift towards an **'integrated services/projects planning from individual services/projects approach'** to actualize transformations on the ground efficiently and effectively.

Technology Integration and Digital Transformation

Undoubtedly, the world economy has entered the era of the 4th Industrial Revolution, wherein technology integration is fundamental to driving successful economic growth and development. For India to pick the pace in technology leadership, there is an increasing need to recognize and take significant measures to plan for integrated technological approaches to solve standard problems. Effective planning for integrating technologies – including Information Technology (IT), geospatial, and allied technologies, particularly in a Cloud environment, is now critical while devising policy frameworks, intervention strategies, governing structures, and implementation programs.

In the above context, it is notable that the Government of India, under its integrated national programs and initiatives, and otherwise, through strategic reforms, advocates and pushes for technology-integrated intervention strategies to maintain and enhance socio-economic leadership. Almost all national programs and projects announced in the recent past have an underlying technology component to their workflows, be it the GIS-based GatiShakti Platform or the use of ICT in rolling out 5G in the country. Today, digital capabilities are omnipresent, even if unevenly distributed, quickly and radically, creating significant economic value to the Indian economy.

Among others, geospatial information management and technology solutions are known to be the most significant enabler of revealing interactions and inter-linkages between bio-physical (i.e., geography and natural resources) and social elements (human civilization) over time and Space considerations crucial for effective planning and efficient delivery of governance and socio-economic benefits. Overall, geospatial information management has been a direct beneficiary of advancements in Information and Communication Technologies (ICT). It rides conveniently on the maturing digital ecosystem delivering value to end consumers/ citizens in an integrated manner.

Today, within India, geospatial (inclusive of Space) is seemingly the highest priority of the Government of India. Over the past two years, the Government, with the Guidelines for Geospatial Data announcement in Feb 2021, and the Drone Rules in August 2021, has democratized and liberalized the extended archaic limitations on geospatial data and information. Various ministries and departments have initiated and integrated technology approaches (inclusive of geospatial) into development planning, governance delivery, and enterprise-wide workflow management needs.

India's Geospatial Readiness

The Indian government has undertaken several mission mode projects grouped under integrated initiatives like SVAMITVA, AMRUT, Digital India, National Hydrology Program, and Smart city mission, among others, to achieve the 'New India Vision: 2030'. While this integrated program approach with multiple cross-cutting projects is highly commendable, a comprehensive, coordinated effort to enhance adequate geospatial information technology embedment into these programs is highly required. Despite India's long history of topographic survey/mapping, globally acknowledged accomplishments in space and ICT technology domains with a strong focus on social impact applications, an array of commercial and development imperatives for technology uptake; the Indian geospatial sector still requires an integrated approach cutting across the various technology segments, and governance structures at national and state level to acquire maximum benefits in using technology in different areas.

The Indian geospatial sector ecosystem must come at par with its potential to add to the national growth and development objectives compared to nations with similar or smaller geopolitical, economic, and demographic heft. To unlock the potential and economic value of geospatial technology, widespread adoption and implementation of geospatial technology is required. The economic value of geospatial technology use will be proportionate to the extent digital applications embed geospatial/location intelligence as a critical component, permeating across economic verticals. It is important to note that the geospatial readiness of India's private firms/consultants is high as the government policies/mandates already support large-scale technology implementation; however, the government agencies' readiness is significantly low and will require strategic efforts to catalyze broad-based digitalization.

INDIA BECOMES THE WORLD'S FIFTH-LARGEST ECONOMY

With seven percent growth forecast for 2022, India's economy is today the fifth biggest economy in the world with GDP placed at USD 3.2 trillion in 2021. In PPP terms, India continued to be the third largest economy in the world in 2021

- India's economy has overtaken the United Kingdom's in terms of size, making it the fifth largest economy in the world.
- It was the world's 10th largest economy a decade ago.
- The Indian economy is forecasted to grow by seven percent in 2022.

India's GDP growth and it's global position over the years (1981-2022)

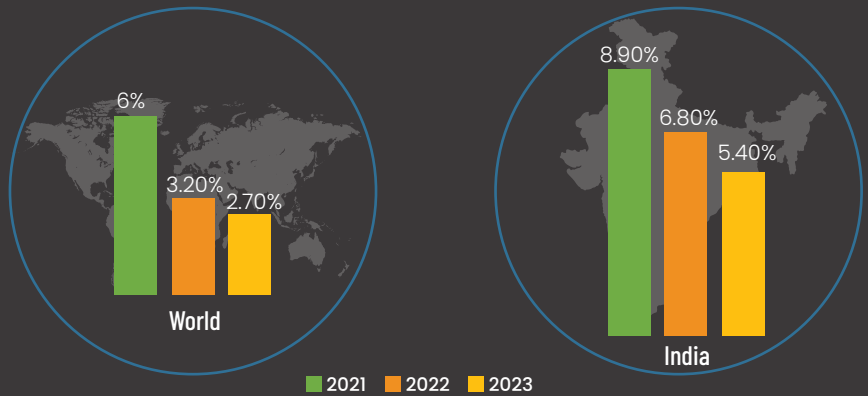
	India's GDP (in dollars billion)	Global Position
1981	196.54	11
1991	274.84	17
2001	495.95	13
2011	1,823.05	10
2014	2,039.13	10
2021	3,177.92	6
2022	3,534.74	5

*2022 Is an IMF forecast

Source: GW Consulting Analysis

- Global growth is forecast to slow from 6.0 percent in 2021 to 3.2 percent in 2022 and 2.7 percent in 2023.
- India's GDP growth while significantly higher than most advancement economies, is forecasted to slow from 8.9 percent in 2021 to 6.8 percent in 2022 and 7 percent in 2023 due to rising inflation, and competitive conditions in the Indian market.

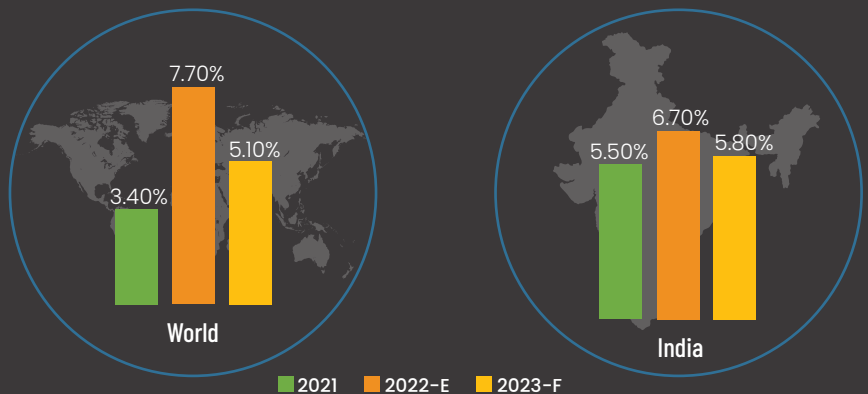
India's Growth Projections vis-à-vis World Growth Projections



Source: International Monetary Fund (IMF)

- India's inflation is forecasted to have risen from 5.50 percent in 2021 to 6.70 percent in 2022 and is expected to fall to 5.8 percent in 2023.
- India's Inflation rate has been high in 2022 owing to spike in crude oil prices in the international market, increase in commodity prices, supply-chain disruptions and geopolitical tensions.

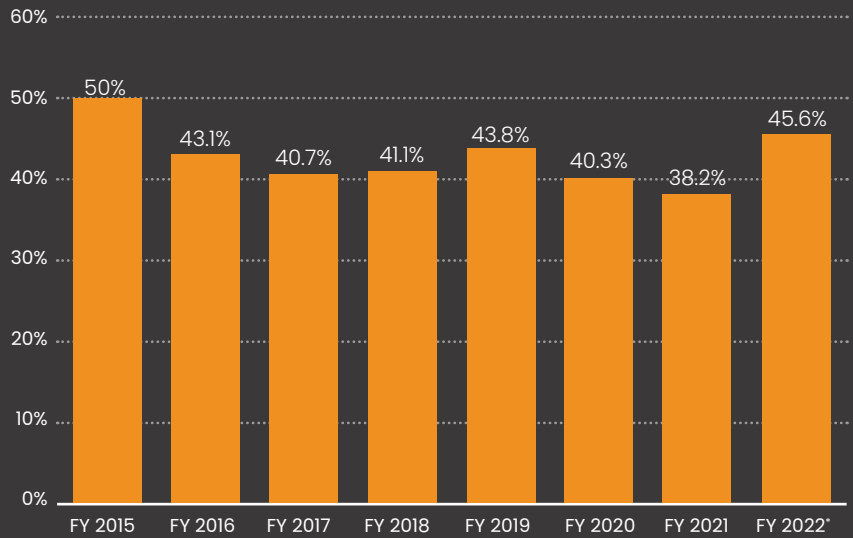
Inflation Rate: India



Source: Asian Development Bank, Asian Development Outlook 2022; and International Monetary Fund

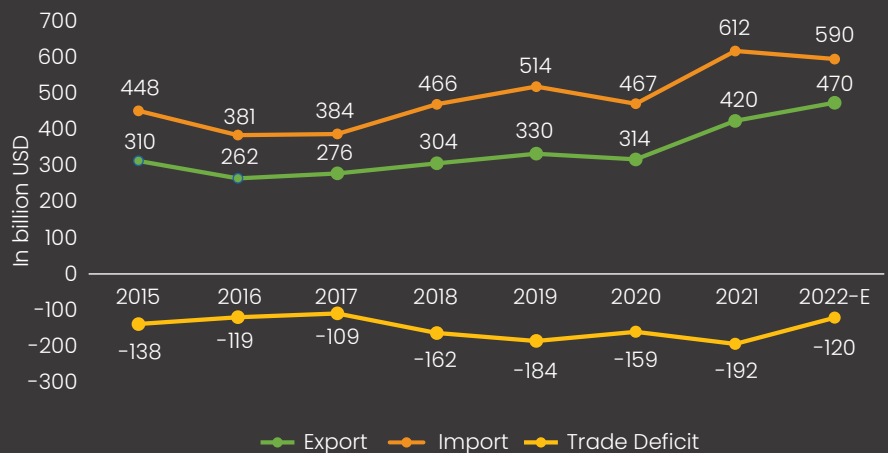
- In fiscal year 2022, the estimated ratio of India's total export and import of goods and services to the GDP was about 46 percent. This was an increase in the ratio from 38.2% as compared to the previous fiscal year in the country.
- Exports in the country while have risen since 2021, continue to witness a slowdown in the later-half of 2022, a reflection of the toughening conditions of global trade, rising global and domestic inflation, high volatility in currencies, and geopolitical tensions.
- India recently implemented bilateral free trade agreements (FTAs), such as those signed with UAE, and Australia which are aimed at amplifying India's export exponentially.
- India's aggressive policy push, coupled with large scale infrastructural augmentation, has resulted in increased volume of exports and imports in the last few years, with USA, and UAE emerging as India's top trading partners.

Total export and import of goods and services to GDP ratio



Source: Statista 2022

India: Trade Statistics (2015-2022)



Source: Reserve Bank of India; Ministry of Commerce, and Industry

PERCENTAGE CHANGE OF GVA OVER LAST YEAR AT CURRENT PRICES FOR Q1 (APRIL - JUNE) 2022-23

32.70%

Construction

15.60%

Manufacturing

8.30%

Agriculture, Forestry, and Fishing

45.40%

Trade, Hotels, Transport, Communication and Service-related to Broadcasting

59.50%

Mining and Quarrying

35.50%

Electricity, Gas, Water Supply & Other Utility Services

2022 INDIAN ECONOMIC OUTLOOK



5th
Largest
Economy in
the World



India's Ease of Doing Business ranking has improved from 142 in 2014 to 63 in 2022

India's Foreign Exchange Reserves stands at **USD 537.50 billion** as of September 2022.



India had **1.2 billion mobile subscribers**, and approximately **750 million active internet users** in 2021



India ranked **37th** in 2022 from **43rd** in 2021 in the World Competitive Index; second among the BRICS countries.



National Logistics Policy, National Monetization Pipeline, National Infrastructure Pipeline – to drive **economic growth**



India's unemployment rate is estimated to be **6.50 percent** in September 2022; while it was **5.98 percent** in 2021.



India ranked **132** in 2021 among 191 countries and territories on the 2021 Human Development Index (HDI)



Source: GW Consulting Analysis

INDIAN GEOSPATIAL INDUSTRY ECOSYSTEM

Against the backdrop of the recent geospatial policy programs, the Indian geospatial industry is undergoing a dynamic transformation. While on absolute assessment, and with the existing policy implementation gap, the impact on the market and technology is seemingly less; however, there is indeed a significant change in the nature of the business offerings currently available and accessible to customers across the Indian geospatial market.

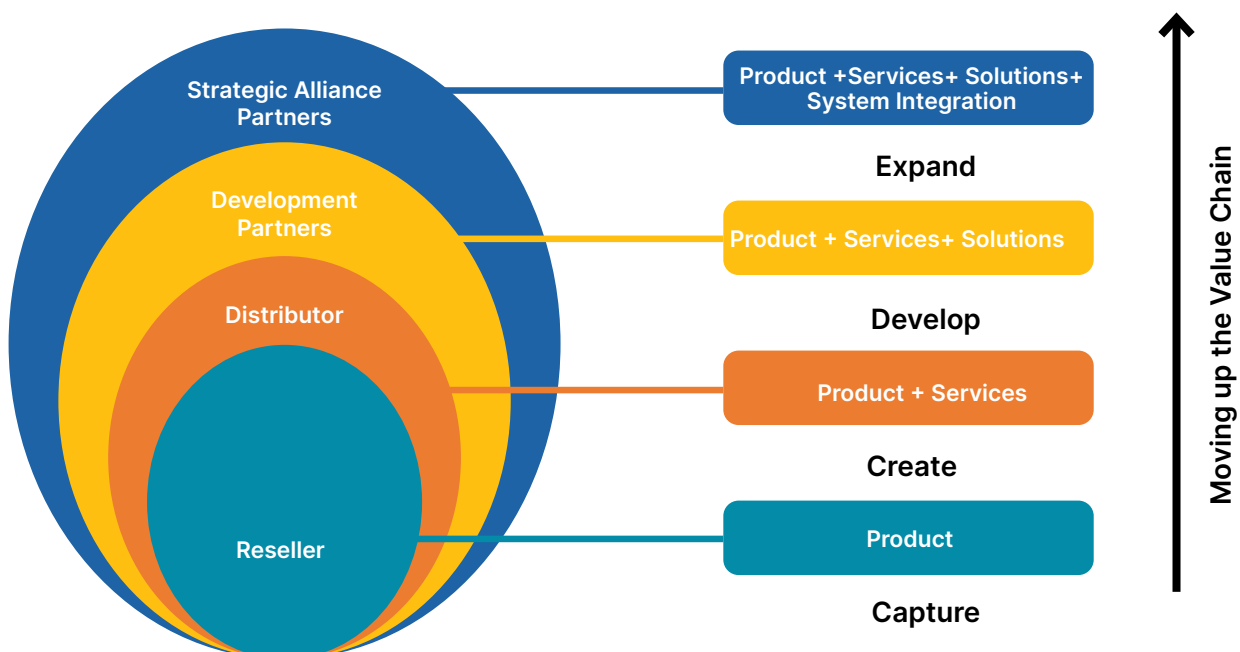
India's geospatial industry has primarily been a services industry, with the services segment constituting approximately 75 percent of the total Indian geospatial market in FY 2017-2018. At the time, the major categories of services included land and topographic survey, analytics and data processing, consultancy, and research and development. **Over the years, the market share for services has significantly fallen from 75 percent to approximately 50 percent of the total market.** This shift or transition in the market is due to the increasing market share of hardware, software, and solutions segments within the Indian geospatial ecosystem.

It is noteworthy, that this shift is not due to the absolute reduction in services businesses; instead, the total number of services companies within the Indian ecosystem has continued to grow year-on-year and is expected to grow furthermore as opportunities within the industry will rise due to the recent democratization and liberalization of geospatial data and information. There are more than 6000 service enterprises, with more than 90 percent being micro enterprises (up to 20 personnel). These are small and unorganized players who only cater to projects depending on local/regional geographic presence.

However, even as the number of services businesses grows, the solutions business too has expanded within the Indian geospatial ecosystem over the past couple of years. This is due to the changing user expectations and the global technology trends and drivers in the market. The traditionally larger service companies – are no longer service companies today but have moved up the value chain of the ecosystem to offer specific, fit-for-purpose solutions for high-end precision and special domain survey services and value-added analytics to domestic customers and overseas markets.

GRAPH 1

India's Geospatial Industry Moving Up the Value Chain: From Service to Solutions



Source: GW Consulting Analysis

Geospatial Industry – SWOT Analysis

STRENGTHS	WEAKNESS
<p>Economy</p> <ul style="list-style-type: none"> The Indian economy, has fully recovered to the pre-pandemic real GDP level of 2019-2020, with almost seven percent Real GDP growth and USD 3.12 trillion in GD in 2022 India's economy, has overtaken United Kingdom's economy to be the fifth largest economy in the world in 2022 Digital and IT infrastructure in the country is growing significantly with affordable internet connectivity and the widespread use of smartphones. FDI up to 100 percent in satellites-establishment and operations under the Department of Space/ISRO under the government route <p>Knowledge Resources</p> <ul style="list-style-type: none"> Well established and diversified institutional base for fundamental and applied research in geospatial domain. <p>Space applications:</p> <ul style="list-style-type: none"> Globally acknowledged remote sensing program driven by user needs for development applications. Functional indigenous satellite based augmentation system (GAGAN), and satellite communication systems – Indian Regional Navigation Satellite System (IRNSS). Privatization of Space has brought in new entrepreneurs within the space ecosystem who are developing innovative launch vehicles, satellites, propulsion engines, remote sensors, etc – democratizing access to space technology. <p>Industry Capacity</p> <ul style="list-style-type: none"> Strong credentials of Indian knowledge workforce and service providers in catering to overseas market requirements along with cost efficiencies. Well diversified presence of services and solutions providers across value chains catering to domestic and export demands. Local presence of global geospatial technology providers in Indian market both for outsourcing and local business development adds to the industry's ability to deliver and create spill-overs. Widening Geospatial Industry Representation with Association of Geospatial Industries (AGI), Surveying and Mapping Association (SAMA), Geospatial Taskforce of the Federation of Indian Chambers of Commerce and Industry (FICCI), National Association of Software and Services Companies (NASSCOM), Indian Space Association (ISpA), Satcom Industry Association (SIA), Drone Federation of India, to name a few. 	<p>Geospatial Infrastructure</p> <ul style="list-style-type: none"> Lack of significant and sufficient investment push/funding for National Geospatial Agencies such as Survey of India, Indian Space Research Organization, Geological Survey of India, etc. Absence of robust geodetic and terrestrial positioning augmentation infrastructure hinders growth of commercial, industrial, and scientific applications requiring precision and accuracy. Ineffective geospatial data infrastructure at state and national levels. <p>Government Contracts and Project Awards</p> <ul style="list-style-type: none"> Lack of dynamic and technology-sound tender procurement guidelines, leading to unawarded tenders Lack of provisions for geospatial SMEs and MSMEs to participate in National Project Bids Lack of geospatial projects at project planning, designing and implementation levels in sectoral projects Payment delays in government projects restricts Indigenous companies to cater to the domestic market <p>User Adoption</p> <ul style="list-style-type: none"> Low awareness and exposure on benefits from geospatial information management and data-driven decision support systems among decision makers/user departments hampers demand/ adoption. Lack of in-house technology integration capacities and skilled human resources to maintain and upgrade geospatial infrastructure and solutions especially at government departments. Lack of awareness, an established IT infrastructure, and suitable human resources are a few of the state-level challenges that hinder geospatial adoption in these states. Lack of benchmarks for technology implementation and unavailability of well-defined independent and inter-dependent sectoral strategies Inefficient geospatial project formulation capacities at user departments, and consultants results in GIS projects drafted on the lines of regular IT projects causing delivery and subsequent maintenance issues peculiar to domain. <p>Industry</p> <ul style="list-style-type: none"> Lack of an Industrial Geospatial Development Strategy to develop a robust, competitive and technology driven geospatial market and economy Missing domestic manufacturing in sensors & equipment (i.e. hardware) category with associated issues of supply, price, choices, local use conditions and upgrades, etc. Industry focus more on 'product sales' than delivering solutions to customers hampers market development, trust building, and low returns to customer on capital deployed on software and hardware procurement. Instances of industry players adhering to cost cutting to win contracts leading to lack of trust among peers, under delivery, delays etc. Low bids by technology service providers also leads to cancellation of projects. Heavy dependence on public sector procurements for business Insignificant collaboration between National Geospatial Agencies and Indian geospatial entities particularly SMEs and MSMEs <p>Human Resource Development</p> <ul style="list-style-type: none"> Lack of integrated approach on geospatial domain education, industry-oriented skill development and certification, entrepreneurship and startup development. Lack of focused initiatives on skill certification and development impacting the employee, employee remuneration and service level standardization in the industry.

OPPORTUNITIES

Market Growth

- India's total geospatial market (including both domestic and export market) is estimated to be worth approximately INR 27.65 thousand crores in 2022, rising from INR 22.94 thousand crores in 2019, at a CAGR of 6.43 percent.
- The Indian geospatial export market is expected to rise at a CAGR of 6.5 percent between 2022 and 2025, i.e., from INR 11.63 thousand crores in 2022 to approximately INR 14.07 thousand crores by 2025.

Government Focus

- Increasing government focus on use of geospatial products (hardware and software) and solutions across national mission mode programs and initiatives, coupled with investment push for developing nationwide modern geospatially enabled physical and digital infrastructure.
- Geospatial technology specific mandates across projects important for national economy – such as highway projects, telecommunications, and logistics.
- Increasing potential for GIS-based decision support systems for enhanced visualization, and predictive analysis especially in state governments and in leading state economies.
- Unfolding of opportunities for geospatial adoption at local governance levels such as SMART cities, urban bodies, road transport and highways, telecommunication, to name a few.

Liberalization, Democratization and Commercialization of Geospatial Information

- The Guidelines for Geospatial Data, announced 15th Feb 2021, is a step forward by the Indian policy makers to liberalize, democratize, and commercialize the use of geospatial data and information for surveying and mapping requirements of the country, while also boosting geospatial entrepreneurship across varied technology segments.
- With the privatization of space, there is a widening scope for enhanced commercialization of the space (inclusive of earth observation) ecosystem, allowing greater private sector/ SME participation, thus leading to higher number of space startups (both upstream and downstream) in the country over the past two years.
- The Indian geospatial industry is becoming increasingly competitive as the Guidelines enhance the competitiveness of Indian geospatial companies around the world – enabling the industry to scale and move up the value chain to deliver wholesome solutions to both domestic and international market.
- The decentralized approach of the policies has created a dynamic environment for Indian geospatial firms to partner/collaborate with not only Indian entities but also foreign entities (including IT firms) to deliver highly precise and accurately detailed maps catering to all consumer services segment.
- The reforms will also result in formalization of the economy, unlocking tremendous opportunities for India – fostering innovation, and invention, encouraging new technology adoption, enabling the transition from data to knowledge, creating significant value-creation for the Indian economy and society.

Consumer Expectations

- The Indian consumer industry is maturing at a significant rate, wherein opportunity lies for the adoption and application of geospatial information and technology beyond traditional economic sectors – to non-traditional sectors such as retail and supply chain and logistics, healthcare, mobility, real-estate, and banking, finance services and, and insurance (BFSI).
- The integration of geospatial technologies and solutions across construction and infrastructure sector and urban development workflows is also a significant market opportunity for the geospatial industry.
- The consumer expectation is maturing from hardware and software to wholesome solutions – thus creating opportunity to innovate and cater to the changing customer expectations.

Untapped Human Resource

- Large untapped opportunity in human resource development/ education sector for trainers, vocational skills certification/ industry- oriented certificate courses, innovation, and entrepreneurship promotion initiatives with inter-disciplinary study options.
- The government's commitment to developing the geospatial knowledge base for three categories of professionals – skilled workflows, technical professionals, and experts will enhance the uptake of geospatial knowledge in students and professionals at an early age, thus, creating a dynamic environment for innovative solution-based tech-startups in the country.

THREATS

Geospatial Infrastructure

- Continued delay in establishing a modern and precise geodetic, terrestrial positioning augmentation infrastructure can negatively impact country's competitiveness in digital economy and strategic interests.
- India's geospatial infrastructure still is at level two static maturity: wherein there is no collaboration across different stakeholder agencies and most time these agencies function in silos; data collection and analysis are not in real-time, and while geospatial standards are adopted, they are not implemented effectively.

Policy Implementation Gap

- Two critical policies continue to be in Draft stage; and the implementation of the Guidelines for Geospatial Data at intricate, workflow and enterprise level is at an extremely nascent or almost negligible stage. The policy implementation gap is forcing Indian industries to question the initial over enthusiasm around the Guidelines and shift their business strategy back to exports market instead of focussing on domestic market.

User Adoption

- Fragmented and piecemeal project implementation result in failures or sub optimal results create a mental block against enhanced adoption in new projects by both industry and users.
- Not addressing the issue of effective technology integration mechanisms and human resources can derail state and local bodies objectives of inclusive governance delivery.

Integrated Planning

- Delay in coming up with holistic geospatial sector development framework and coordination mechanism to oversee its implementation will result in loss of missed commercial and development opportunities for the country.

THE INDIAN GEOSPATIAL MARKET

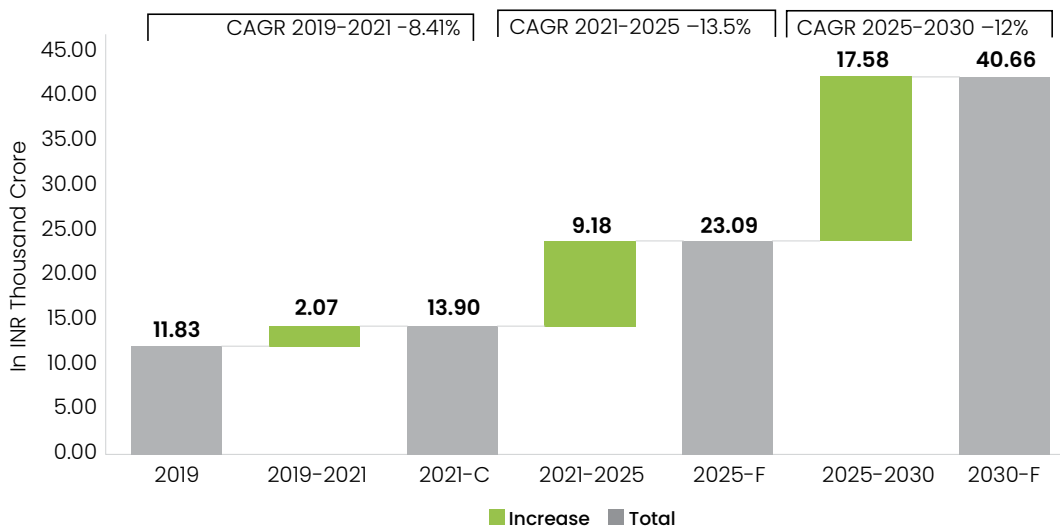
The Indian geospatial industry is undergoing a transition from data to knowledge, and from being a service to a solutions industry, supported by the significant policy reforms announced by the Government of India in 2021. While India has been at the forefront of the geospatial applications and services globally, the geospatial industry is finally bullish about the possibilities that exist today with respect to geospatial technology and its adoption across national programs and initiatives and this is very much reflective of the strategic growth happening within the ecosystem, the partnership and mergers and acquisition trends, rise of new geospatial startups, and the gradual expansion of geospatial export services to the world.

1. India's total geospatial market forecasted to be INR 37.16 thousand crores by 2025

- India's total geospatial market (including both domestic and export market) is estimated to be worth approximately INR 27.65 thousand crores in 2022, rising from INR 22.94 thousand crores in 2019, at a CAGR of 6.43 percent.
- With the enabling policy environment, and the gradual transition of the industry to offer services and solutions to worldwide market, India's total geospatial market is forecasted to rise to INR 37.16 thousand crores by 2025, growing at a CAGR of 10.35 percent between 2022 and 2025.

GRAPH 2

Indian Geospatial Market Size and Forecast -2019-2030F



C-Corrected
F-Forecasted

Source: GW Consulting Analysis

Adjusted for 3% inflation for 2025-2030

India's domestic geospatial market is estimated to grow at a significantly high CAGR, i.e., approximately 13.5 percent between 2021 and 2025. The market is forecasted to rise from INR 13.90 thousand crores (corrected from 2021 Geospatial Artha report's estimation of INR 14 thousand crores); to approximately INR 23.09 thousand crores. This growth is attributed to

- India's swift and continued economic recovery to 90 percent of the pre-pandemic levels, and transition towards digitalization to drive geospatial adoption.
- Critical announcements by the Government of India for liberalization and democratization of geospatial data – particularly, the Guidelines for Geospatial Data 2021, and the Drone Rules 2021 is already seeding future of the Indian geospatial market.

- Indigenous growth of geospatial solution companies such as MapMyIndia, Magnasoft, Esri India, NeoGeoInfo Technologies, to name a few, are competing with global players and building a successful Indian geospatial ecosystem with significant investments in technology and content management.
- Increasing interest and showcase of intent by global geospatial industry players (Trimble, Hexagon, FARO, Topcon Positioning, etc.) to import hardware equipment's (Total Stations, LiDAR, GNSS sensors, etc.) within the Indian ecosystem; developing software, APIs and applications, low-cost data processing and image processing services; establishing research and development (R&D) centres to develop solutions in the areas of deep learning, GeoAI solutions, cloud, big data analytics; among other things, will enhance domestic capability and capacity.
- Strategic push by the Government of India to adopt the latest technologies (including geospatial information and technology) across national mission-mode projects to achieve the vision of five trillion-dollar economy by 2025; with an aim to simultaneously improve productivity, efficiency, and efficacy across all economic sectors contributes to geospatial market growth.

2. India's GNSS and Positioning to hold approximately 59 percent market share in 2022

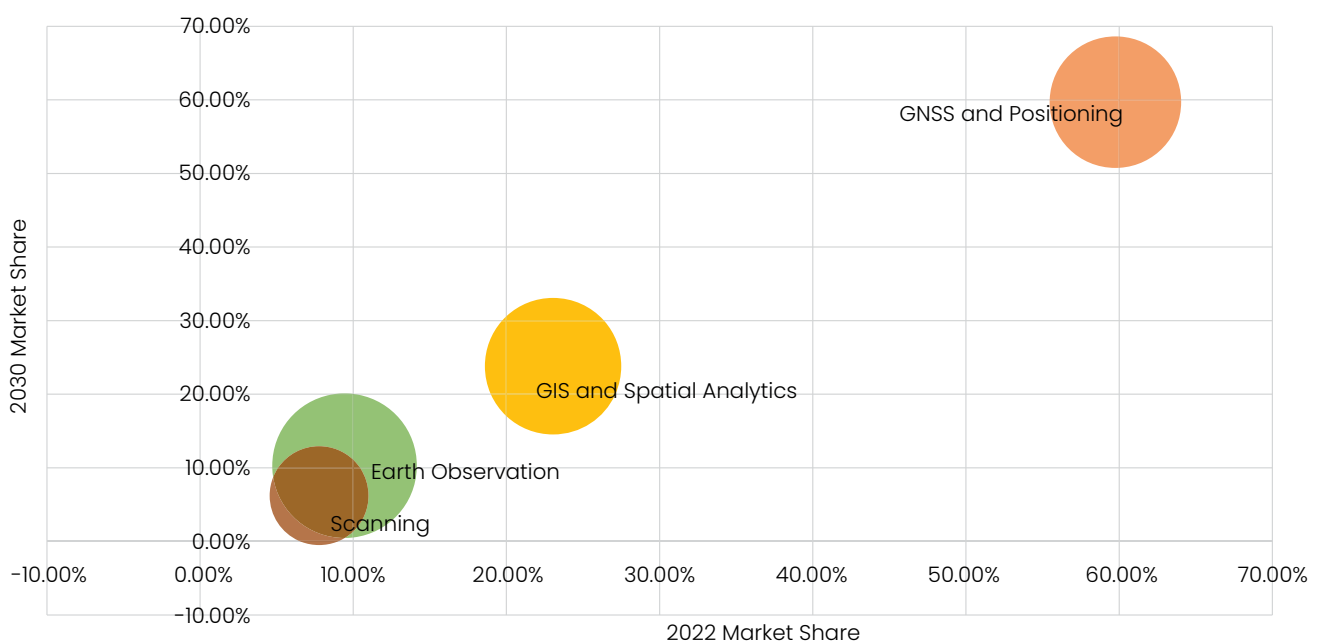
- Amongst the geospatial technology segments, the GNSS and Positioning segment is forecasted to have the highest market share in 2022, with approximately 59 percent of the total market share, followed by, GIS and Spatial Analytics market with approximately 23 percent of the total market, and lastly by the earth observation segment and scanning with 9.4 percent and 7.7 percent respectively.

3. GIS and Spatial Analytics and Earth Observation to drive the Indian geospatial market between 2022 and 2025

- The GIS market is forecasted to increase owing to increase in adoption across non-traditional sectors such as smart cities, banking and finance, and facilities management, integration of GIS with mainstream technologies for business intelligence, and construction and infrastructure, and growth in demand for enterprise-wide GIS solutions.
- The earth observation market is forecasted to increase due to significant push by the Government of India to space-based technologies, and space data; along with further impetus to the use of Drones/UAVs across major government programs and initiatives such as land administration and national highway.

GRAPH 3

Indian Geospatial Industry Technology-wise Market Share 2022 & 2030F



C-Corrected
E-Estimated
F-Forecasted

Source: GW Consulting Analysis

Adjusted for 3% inflation for 2025-2030

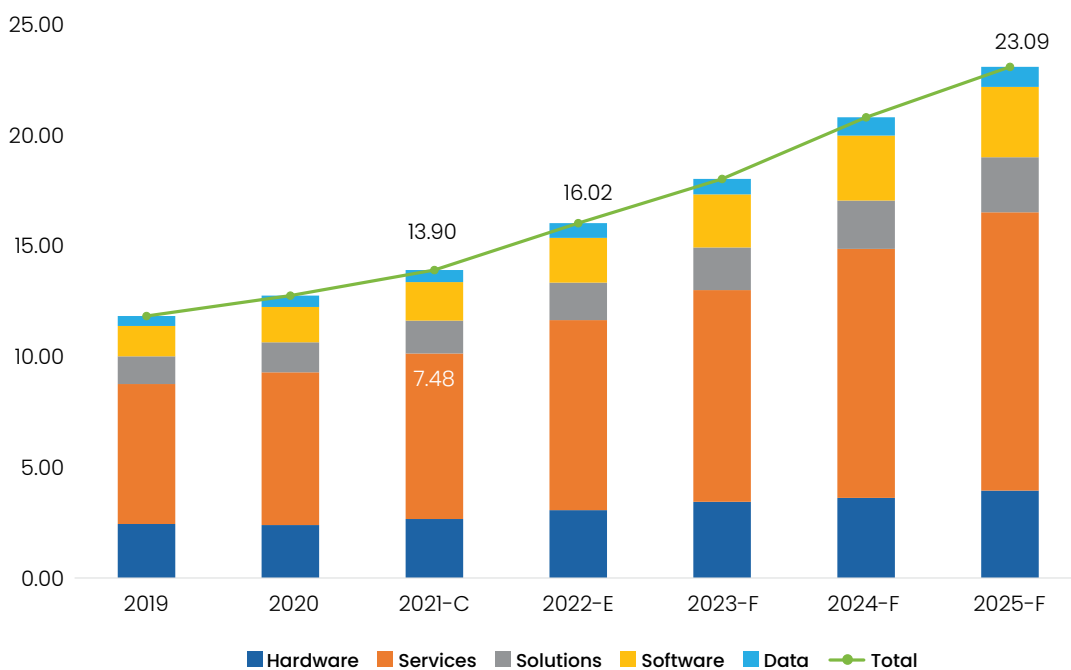
Indian Geospatial Market: By Business Offerings

The Indian geospatial industry as forecasted above is expected to grow at a significant growth rate. When assessed as per the business offerings – the services market is expected to be the largest growth driver for the Indian geospatial industry.

- Alternatively, the geospatial solutions market is also expected to showcase a positive growth rate. The liberalization and democratization of geospatial data with the announcement of the Guidelines for Geospatial Data announced in Feb 2021, the increasing awareness and understanding of geospatial solutions, and the rising demand for wholesome solutions to solve a problem, instead of piecemeal solution – will drive the market for geospatial solutions in India.

GRAPH 4

Indian Geospatial Market Size and Forecast By Business Offerings 2019-2025



C-Corrected
E -Estimated
F-Forecasted

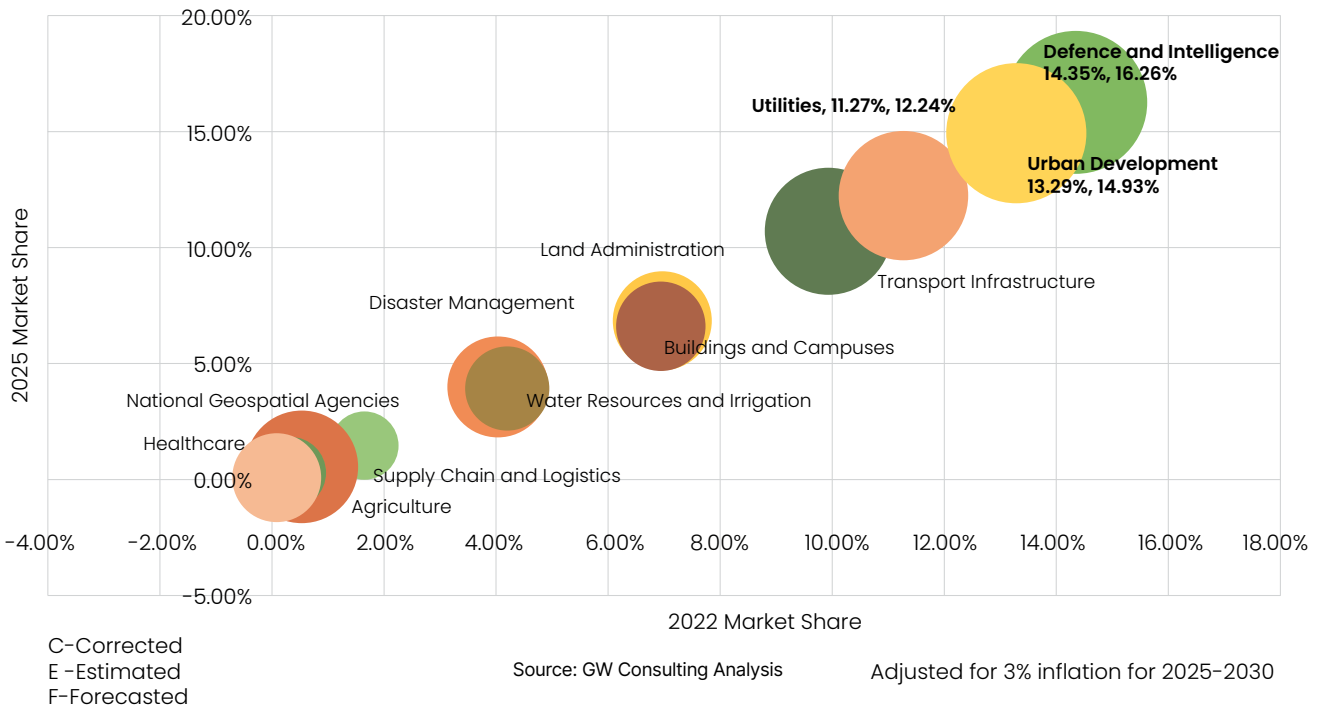
Source: GW Consulting Analysis

Indian Geospatial Market: By Sectoral Market Share

Geospatial information and technology as an empowering technology redefines the paradigms of sectoral output (GVA). It holds critical importance in all sectors of the economy, as all of them today, more than ever, require predictive analytics, modeling, and simulations to enhance productivity, efficiency, transparency, and monitoring in their workflows. It is a crucial enabler in policy planning, implementation, and engagement with citizens. Governments and businesses are increasingly relying on geospatial technology to improve services to citizens/customers –be it tracking illegal construction, ensuring compliance, minimizing environmental energy, planning energy resources, improving emergency response, or planning sustainable development. The use of geospatial technologies through sectoral applications adds knowledge to enterprise economy (particularly the gross value added) at a quick pace.

With respect to sectoral application areas, the geospatial market of India in 2022, and 2025 is dominated by Defense and Intelligence, Urban Development, and Utilities sector. Together in 2022, these sectors accounted for 38.91 percent, up from 37.98 percent in 2021 – with each sector accounting for 14.35 percent, 13.29 percent, and 11.27 percent, respectively. The other two sectors contributing significantly to the Indian geospatial market in 2022 are transport infrastructure, roads, railways, airports, and ports) and the buildings and campuses segment having an estimated market share of 9.93 percent, and 6.97 percent, respectively. Altogether, the five sectors mentioned above account for 50 percent plus of India's total geospatial market in 2022.

GRAPH 5
Indian Geospatial Industry Sectoral Market Share 2022 & 2025



Alternatively, in 2025, the geospatial market will continue to be dominated by the Defense and Intelligence and Urban Development, and Utilities sectors, with each sector accounting for 16.26 percent, 14.93 percent, and 12.94 percent respectively. Alternatively, the transport infrastructure sector, and the land administration sector are going to be the next two priority sectors by 2025, where in market share of these sectors is estimated to 10.70 percent, and 6.61 percent respectively.

INDIAN GEOSPATIAL ECONOMY 2022

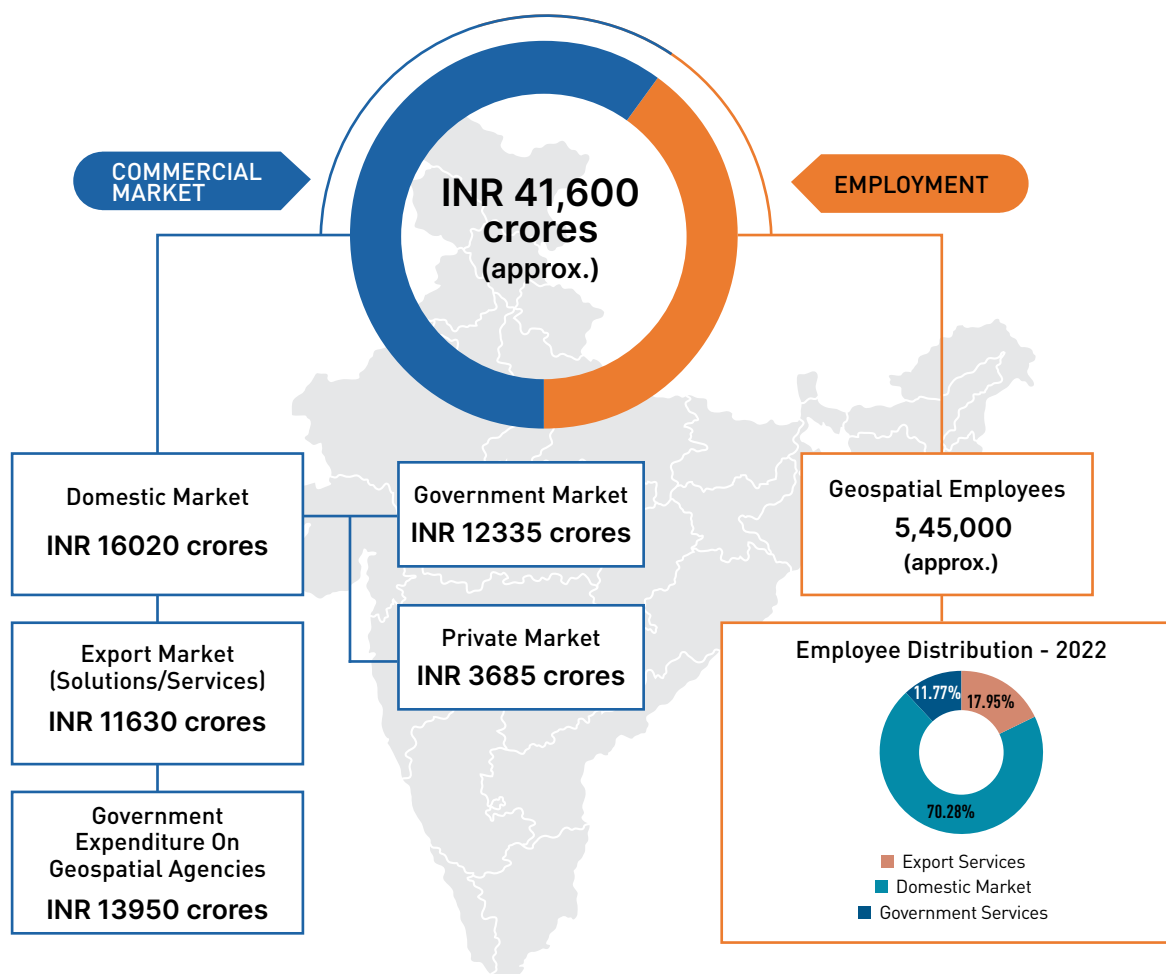
The Indian Geospatial Market comprises of the following key components -

- domestic market size through commercial procurement of hardware, software, data, and services (inclusive of import value of geospatial hardware, software, data and services) segregated further into government market and private market
- export value of geospatial hardware, software, data, and services.
- government investment on creation and maintenance of geospatial data, infrastructure and institutions, that is, government expenditure on national geospatial organizations and associated government departments, such as, municipalities, provinces, etc.

In 2021, India's geospatial economy was valued at INR 38.97 thousand crores employing approximately 4,70,000 people across the country spread across the economy(including user industries, government services, and export services). In 2022, India's geospatial economy is valued at INR 41.6 thousand crores employing approximately 5,45,000 people across the geospatial economy.

Indian Geospatial Economy 2022

Galloping towards an Economic Impact of 2.16 lakh crore!



Source: GW Consulting Analysis

DOMESTIC MARKET

- India's domestic geospatial market is valued at approximately INR 16020 crore in 2022 and is forecasted to grow at a CAGR of 12.9 percent by 2025 to approximately INR 23100crore.
- Sectorally, the traditional sectors (inclusive of defence and intelligence, transport infrastructure, urban development, utilities, etc.) account for the maximum share of the geospatial market in India in 2021 and 2025 respectively – i.e., up to 55 percent of the total market share. Defence and Intelligence, followed by Urban Development, Utilities and Transport Infrastructure are future growth sectors.
- Non-traditional sectors such as banking and finance, insurance, supply chain and logistics, etc., are new sectors where the adoption of geospatial technologies (primarily digital maps) is at a nascent stage. These sectors constitute approximately 8 percent of the total domestic market.

INTERNATIONAL TRADE

- The Indian geospatial industry relies heavily on geospatial hardware and software imports for its geospatial technology requirements. For 2022, the amount spent is estimated to be approximately INR 3256 crores. The country imports most of its geospatial hardware equipment's, such as Total Stations, LiDAR, Mobile Mapping devices, etc., from leading geospatial technology providers of United States, Europe and China. While the imports
- As the market for geospatial information and technology increases in the country driven by the impetus provided by government projects, technology mandates, FDI approvals, and technology innovations there is a significant increase in the consumption of geospatial data and technology worldwide. India being a hub of global IT exports, also exports geospatial services and solutions in high percentages to countries worldwide. The export market for geospatial services and solutions was INR 11122 crores in FY 21, and it is estimated to have risen by 3.6 percent to be INR 11630 crores by 2022. The export market is further estimated to be INR 14070 crores by FY 2025 (projections significantly higher than last year) and is estimated to rise to INR 13100 crores by 2025.
- Leading geospatial companies of India such as Cyient, Genesys, Ceinsys, etc., export geospatial-related services and solutions to foreign markets. Many indigenous companies such as NeoGeoInfo Technologies, Roter Group of Companies, and Marvel Geospatial Solutions, have expanded their offices and business operations in foreign countries to expand their services and solutions delivery. Simultaneously, globally recognized system integrator and consulting firms such as AECOM, Atkins, Arup, etc.,; and information technology firms like Tech Mahindra, Infosys, etc., are exporting most of their geospatial services outside India.

GOVERNMENT INVESTMENT

- During 2022, the government invested approximately INR 13950 crore in National Geospatial Agencies. This is not a significant growth in investment on governments behalf on national geospatial agencies.
- At present, the government investments for the national geospatial agencies is spent heavily on developing in-house GIS software and data-integration platforms and sourcing hardware equipment's for centrally and state-allocated projects such as SVAMITVA, National Hydrology Project (NHP), National Infrastructure Pipeline (NIP), etc.

EMPLOYMENT

- In 2021, the Indian geospatial industry employed 4,70,000 people including domestic employment, export services and employees in the government services; and this number estimated to have increased to approximately 5,45,000.
- Of these 5,45,000, about 70 percent of employees were employed in the domestic geospatial market (including user segments), that is, approximately, 3,81,500 people were employed by the companies providing and using geospatial solutions in India.
- Further, the total number of employees engaged in export-related services in 2022 were nearly 98,100, i.e., 18 percent of the total number of employees in the geospatial ecosystem.

POLICY IMPACT AND IMPLICATIONS

This segment of the Geospatial Artha report collates information and insights derived from interactions with the government bodies, user organizations, private geospatial technology providers, and the civil society on the impact of the Guidelines for Geospatial Data announced in Feb 2021, and the Drone Rules announced in 2021. It also brings forth the feedback of the industry on the two policies which have been stuck in the draft stage for quite some time now and are seeking to see the light of the day.

Impact of Guidelines of Geospatial Data and Drone Rules

According to GW Consulting's analysis, the impact of the released Guidelines for Geospatial Data has been significantly higher than the Drones Rules in 2021. According to the survey respondents, the democratization and liberalization of geospatial information has created an optimistic environment within the Indian geospatial ecosystem. The policy has made geospatial data easily available and easy to use, possibly fostering innovation, and creating new employment opportunities.

On the Drone side, again, while the Drones Rules 2021, seemed to have created a positive impact on the market, concerns remain due to vulnerable issues pertaining to restrictions on flying height, challenges in operation on mobile platform to name a few.

58%

Respondents State Positive Impact on
Geospatial Market of Guidelines of Geospatial Data

40%

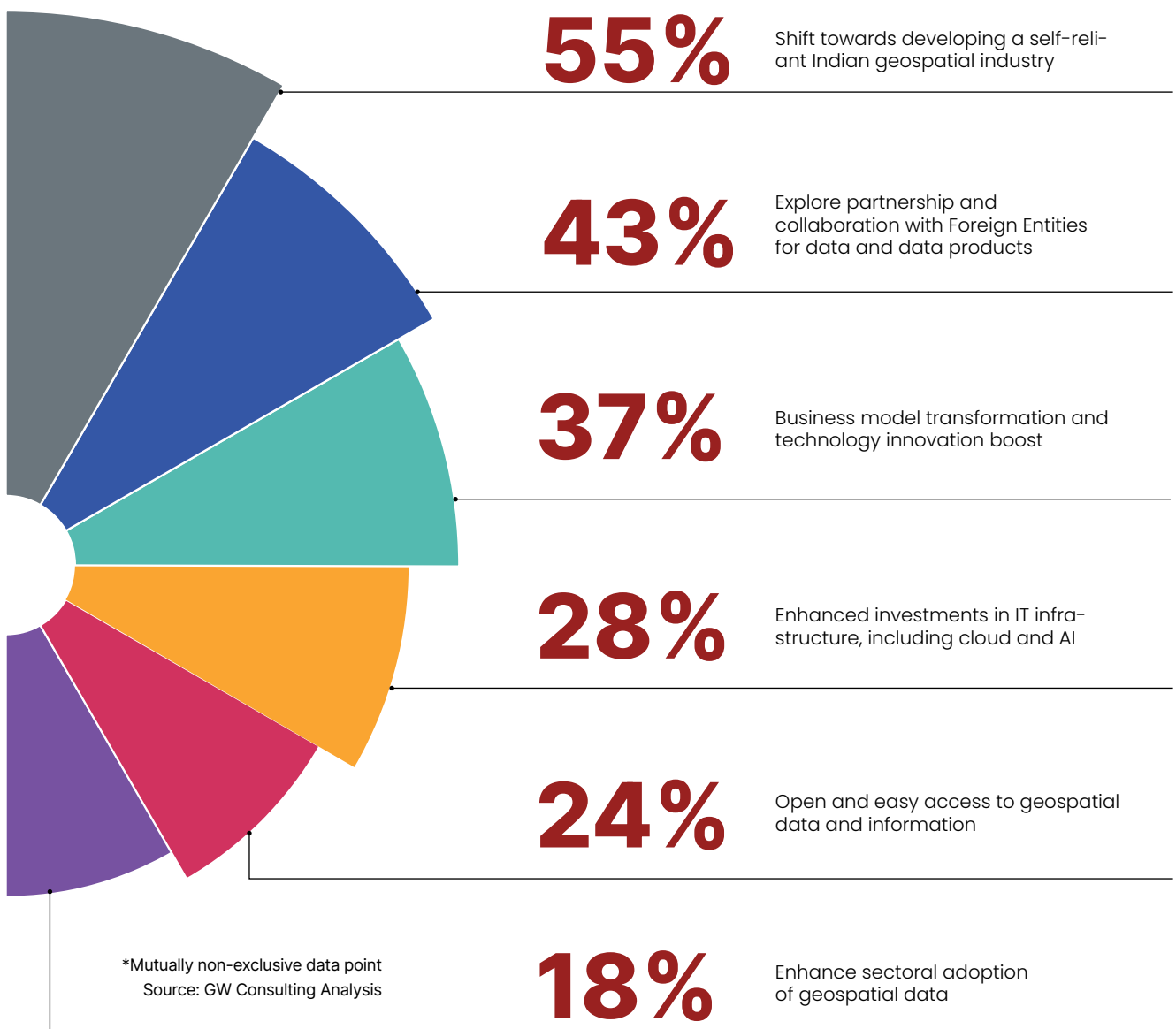
Respondents State Positive Impact
of Drone Rules 2021 on
Indian Geospatial Market

Source: GW Consulting Analysis

Benefits of Guidelines Foreseen Over 18 Months -

As per GW Consulting's analysis, the top three benefits the industry foresees with the announcement of the Guidelines for Geospatial Data, and Drone Rules 2021, is the development of a self-reliant Indian geospatial industry wherein it acts as an impetus for fostering startups, and technology innovation. In addition, the Guidelines enable startups and businesses to use geospatial data to establish their businesses, particularly in the fields of e-commerce and geospatial-based apps and location data and analytics. Indian firms will be able to create indigenous apps, which will reduce India's dependence on foreign applications.

Alternatively, as expected the Guidelines for Geospatial Data has encouraged partnerships and collaboration amongst foreign entities and domestic entities for data and data products. For instance, the partnership amongst Genesys International, Tech Mahindra with Google to launch the Street view platform for India showcases the move of the domestic companies up the value chain to add rich content and localized features to serve Indian consumers better. The tool is expected to add to the process of technology transfer, adding analytical tools to professional and business community, adding meaningful contributions in their respective industries. Further, there is also likely to be an increase in public-private partnerships, with data collection companies collaborating with the Indian government on various sectoral projects. Stakeholders also anticipate an increase in corporate investment in the geospatial sector, as well as an increase in data export to foreign companies and countries, which will boost the economy overall.

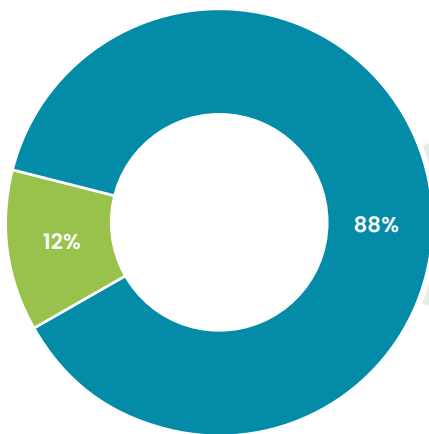


Impact of Policy to Enhance Adoption of Geospatial Technology across Sectoral Workflows

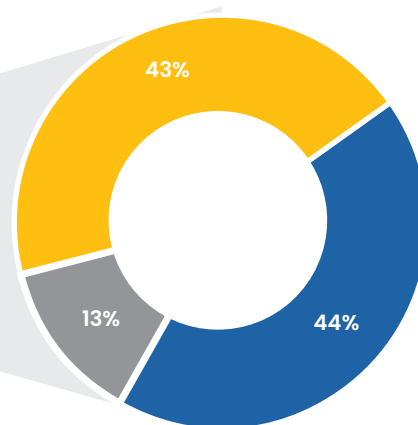
GW Consulting analysis shows that more than 80 percent of the respondents believe that there is going to be a significant impact of the Guidelines and the policy (if implemented) in increasing the adoption of geospatial technologies across sectoral workflows. In India, geospatial technology has made inroads into a variety of sectors, both public and private. Agriculture, telecommunications, oil and gas, environmental management, forestry, public safety, infrastructure, logistics, and other industries rely heavily on geospatial technology in India. According to stakeholders, the geospatial industry will grow by leaps and bounds in the coming years as stakeholders across sectors recognize the utility and long-term cost effectiveness of using geospatial tools and technologies. Well-articulated policy mechanisms, government support, and rising domestic demand would all help to popularize geospatial technology in India and bring it into the mainstream as a tool for effective governance and development planning.

However, of the optimistic respondents, more than 40 percent of them believe that the impact of the Guidelines will only be seen after 3-5 years and no significant change can be expected in the next one or two years. While 44 percent of respondents do see immediate impact, the proportion of the stakeholders who believe that the Guideline or the policy will have a significant impact is far less. This is also due to the current Policy implementation gap.

Respondents perspective on impact of Guidelines for enhanced workflow adoption



Respondents perspective on time period for Impact of Guidelines



■ YES ■ NO

■ 1-3 years ■ 3-5 years ■ More than 5 years

Source: GW Consulting Analysis

ENABLING POLICY ENVIRONMENT - A REALITY CHECK?

Since the release of the Guidelines for Geospatial Data on 15th Feb 2021, the Indian geospatial industry has been excited and motivated to foresee the positive impact and implication of the Guidelines on technology innovation, adoption and business growth. However, now more than one year later, the excitement around the Guidelines for Geospatial Data has seemingly fizzled out. While the Guidelines presented and forecasted an enabling environment for the indigenous geospatial industry to flourish, the impact of the Guideline on business growth and subsequently on local innovation, and market growth has been significantly lower. The policy-implementation gap, i.e., the delay in implementing the Draft National Geospatial Policy [Draft-NGP] and the Draft Space-based Remote Sensing Policy 2020 [Draft SpaceRS Policy] is one of the key factors which is restricting the absolute growth of the Indian geospatial industry. Further, industry does believe that while the implementation of the Guideline for Geospatial Data is a positive step, however, over enthusiasm, and overly optimistic expectation from just one Guideline has resulted in challenging implementation of the policy across dispersed governance, thus impacting the Indian geospatial industry growth and market.

GEOSPATIAL ECONOMY: IMPACT

The Indian Geospatial Economy was projected to be INR 38.97 thousand crores in 2021. It was forecasted to grow to INR 41,760 crore in 2022 based on actual market estimation in the Geospatial Artha Report 2022. Further, GW Consulting estimated that in case the Government of India implemented the three draft policies, i.e., the Draft-National Geospatial Policy 2021 [Draft-NGP 2021], and the Draft Space-based Remote Sensing Policy of India 2022 [Draft-SpaceRS Policy 2020], and the Draft of Indian Satellite Navigation Policy 2021 [SATNAV Policy 2021], and a proposed India Geospatial Industry Development Strategy, the geospatial economy of India would be INR 46.3 thousand crores in 2022. It would approximately touch INR 79.8 thousand crores by 2025. However, unfortunately, due to the lack of formalization of either of the Draft Policies and the lack of the development of the Indian Geospatial Industrial Development Strategy in 2022, the Indian Geospatial Economy, as projected last year, was compromised.

Indian Geospatial Economy – Revised

There is no doubt that the geospatial and allied policies announced by the Government of India in 2021 align with the concept of 'Atmanirbhar Bharat' or 'Self-reliant India'. The Guidelines for Geospatial Data, announced on 15th Feb 2021, liberalized and democratized the geospatial industry of India – with the intent of having a far-reaching impact on the geospatial industry's growth, aligning technology, policy and people accordingly. However, while the entire Indian geospatial industry ecosystem was initially enthused with the possibilities the Guidelines offered, today, there is an increasing discomfort in the market with regard to the policy implementation gap currently being witnessed in the market.

18-24 Months Delay

In policy implementation and formalization

42%

Industry leaders who don't foresee any Impact of the Guidelines for Geospatial Data.

While the industry very well recognizes that the Guidelines design is impeccable and adds a positive change within the Indian geospatial market, the initial overly optimistic expectations are today translating into pessimism. The significant delay (almost 18-24 months) in the implementation and the formalization of the three draft geospatial policies and the increasingly negative outlook within the industry for the Indian geospatial market with its inherent challenges have forced the industry to explore and refocus their business strategies from the domestic market and government businesses to international markets and private businesses only. Earlier on, the Indian geospatial industry was enthused with the opportunity to work in India and simultaneously explore the export market – today; it is strategically having to choose one for its organic growth – thus, impacting the geospatial economy.

Revised Policy Impact Forecast

GW Consulting Analysis' in Geospatial Artha report 2021 analyzed the potential policy impact on the Indian geospatial economy. It was estimated that the Indian geospatial economy would grow substantially in the next three years if, in 2022, the three draft policies were formalized and implemented to support the Guidelines for Geospatial Data. In this scenario, GW analysis forecasted that the Indian geospatial economy would grow to INR 63.1 thousand crores in 2025. The number was positive and generated significant interest in the market.

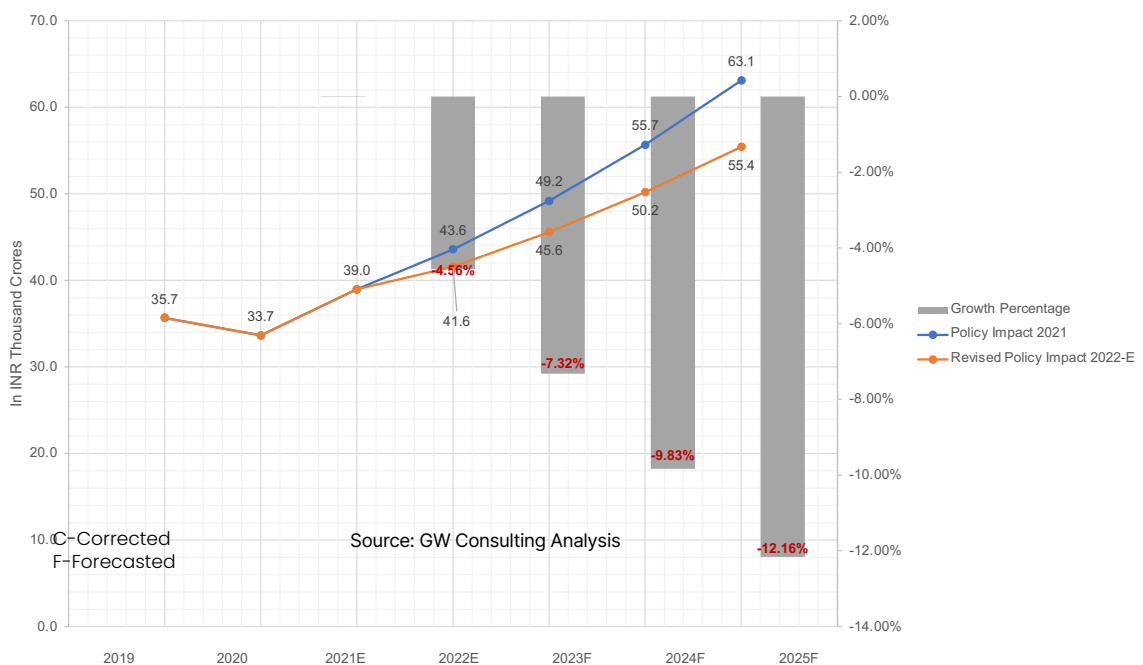
However, today, an analysis of the potential impact of the policy in Quarter four of 2022 highlights a missed opportunity and pushes back the Indian geospatial economy by almost a year. However, **the Indian geospatial economy will still grow if the government implements and formalizes the policy and in additional also implements an implementation framework for Guidelines for Geospatial Data (currently missing) in early 2023** to realize its benefits sooner than later. The impact of NOT formalizing and implementing the policy is seen in India's Geospatial Economy estimates for the year 2022, wherein the economy projections fell by 4.78 percent – from INR 43.6 thousand crores in 2022 to INR 41.6 thousand crores, i.e., by almost INR 2000 crores.

The revised estimates of the policy impact, if they were to be implemented in the first three months of 2023, highlight that the Indian geospatial economy would be worth INR 45.6 thousand crores in 2023. This would be a significant drop of 7.32 percent from the initial policy impact projection of approximately INR 49.2 thousand crores if the policies were implemented in 2022. The assumption taken in this regard is that if the policies were implemented in early 2022, there would have been a grace period for implementation of a year. However, since the policy is forecasted to be implemented in 2023, another additional year of grace period for implementation - i.e., till 2024, will result in negative projections. Alternatively, this delay in policy implementation is forecasted to also have a significant bearing on the Indian geospatial economy in 2025 – wherein the economy is projected to fall by 12.16 percent, i.e., from initially projected INR 63.1 thousand crores to approximately INR 55.4 thousand crores. This, too, is if the policies are implemented in 2023. The more the delay in the formalization of policies, the more significant the negative spillover of the impact on the Indian geospatial economy is expected to be.

Revised Geospatial Industrial Development Strategy Impact Forecast

GRAPH 6

Indian Geospatial Policy Impact On Geospatial Economy: Projected Impact 2021 vis-à-vis Projected Impact 2022 For 2022-2025

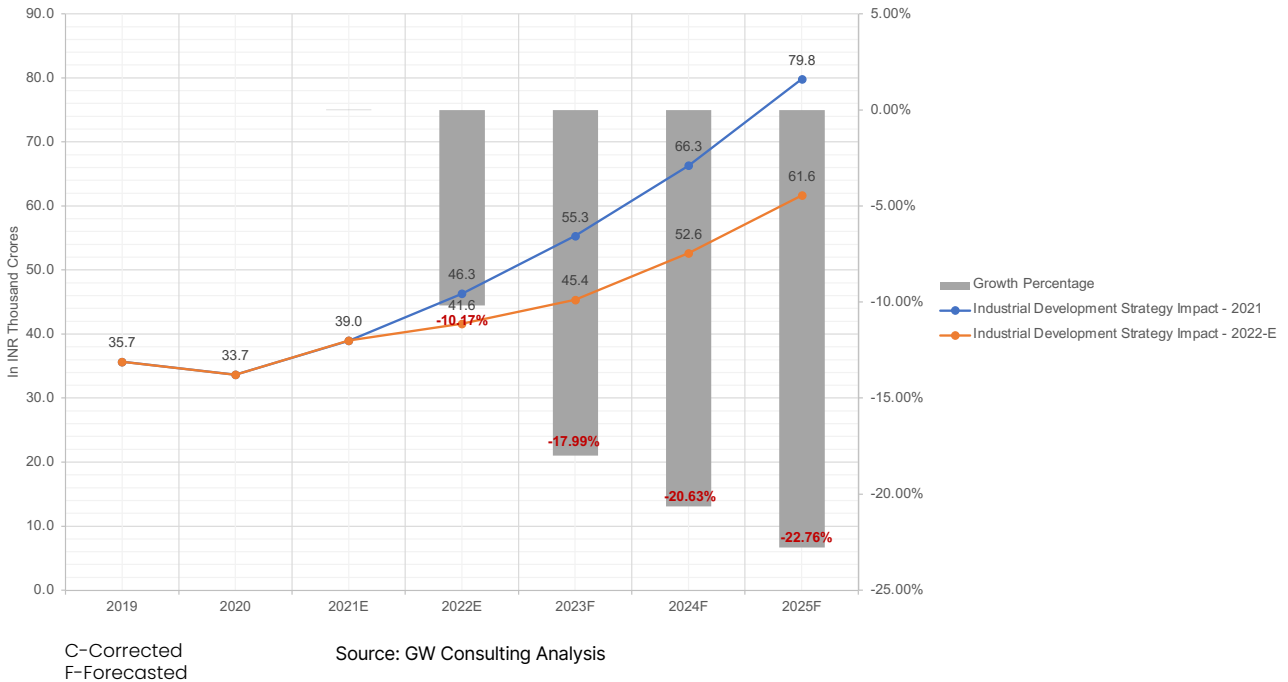


GW Consulting Analysis' in Geospatial Artha report 2021 proposed an Indian Geospatial Industry Development Strategy for the Indian geospatial market growth. Simultaneously, the report predicted that if India implemented and facilitated a Geospatial Industrial Development Strategy in 2022, along with the formalization of the three geospatial policies, the Indian geospatial economy would grow to INR 79.8 thousand crores in 2025.

However, similar to the revised policy impact analysis, in 2022, there was no Geospatial Industrial Development Strategy established which could provide significant impetus to the Indian geospatial market and help it advance up the value chain – focusing on both domestic and export markets significantly, whilst fostering innovation within the ecosystem. Thus, similar to the revised policy estimates, the lack of a dynamic yet targeted geospatial industrial development strategy is a significantly bigger missed opportunity for the Indian geospatial economy, including the domestic market, exports, and imports. Since nothing was formulated specifically for India's Geospatial Industrial Development Strategy in 2022, the economy projections fell by 10.17 percent – from a forecasted INR 46.3 thousand crores to INR 41.6 thousand crores in 2025. **This also includes the impact of the lack of policy formalizations; and a new variable - the implementation framework for Guidelines of Geospatial Data.**

GRAPH 7

Indian Geospatial Industrial Development Strategy Impact On Geospatial Economy: Projected Impact 2021 vis-à-vis Projected Impact 2022 For 2022-2025



Thus, the revised estimates of the India Geospatial Industrial Development Strategy (on top of policy) impact show that in case the government was to seriously consider facilitating a strategy or even an industry board (the Geospatial Industry Development Board) along with formalizing the policies and required implementation framework, the Indian geospatial economy, would be worth INR 45.4 thousand crores in 2023 – albeit less by 17.99 percent, if the efforts for the same were made in 2022 itself. This delay will further impact the Indian geospatial economy by 2025, wherein the economy is forecasted to fall by almost 22.76 percent basis the projections in 2021, i.e., from INR 79.8 thousand crores in 2025 to INR 61.6 thousand crores in 2025. It is noteworthy, a mandate, a strategy, or a policy has a long way to go in contributing to the economy. While the Guideline for Geospatial Data did have an impact - a well-defined implemented policy, strategy and guideline could expand the potential of India’s geospatial economy from the domestic market to exports and imports. (affected factors listed in the industrial strategy proposed in the next section).

Next Step Forward -

There is no doubt that the Indian geospatial industry is moving up the value chain from being a services industry to a solution-driven sector; however, for the industry to mature and move up the value chain, the Indian Geospatial Industrial Development Strategy is critical. The Strategy emphasizes crucial points that need to be undertaken to foster innovation and entrepreneurship in the country, enhance technology adoption, and transform and provide a more leadership role to governments and national geospatial agencies. National Think Tank on Geospatial Strategy for New India proposed India's Geospatial Industrial Development Strategy was developed in the context of India's vision of being an INR 100 thousand crore economy by 2030. The country had the opportunity to implement the Strategy in 2022 and attempt to achieve that goal much faster (without implementation grace period), with the probability of surpassing INR 100 thousand crores by 2030. **However, the delay in the formalization of the policies, and in the absence of a well-defined implementation framework for Guidelines for Geospatial Data) and the formulation of the Geospatial Industrial Strategy, will cause the Indian economy to grow at a slower pace and much closer to a reduced market scenario.**

Thus, in the above context, Geospatial World, reiterates and again proposes the India Geospatial Industrial Development Strategy for review.

INDIA GEOSPATIAL INDUSTRIAL DEVELOPMENT STRATEGY

1

Creation of a Geospatial Industrial Development Board

An empowered high-level Geospatial Industrial Development Board should be formed to encourage, support, strengthen and monitor the implementation of the key facets of the Geospatial Industrial Development Strategy; and the activities of the Indian geospatial entities. The Board should be responsible for –

- The development of guidelines and protocol for the empanelment of Indian companies to undertake projects of importance for national development and security, and
- Monitor and audit Indian companies annually, in terms of their deliveries, adherence and compliance to guidelines and protocols, and capacity development.

2

Partnership and Collaboration with National Geospatial Organizations

The Geospatial Industrial Development Board should be responsible for initiating and collaborating with the Indian National Geospatial Organizations to –

- Develop the foundation data infrastructure
- Define the alignment with global frameworks – Integrated Geospatial Information Framework (IGIF) and Geospatial Knowledge Infrastructure (GKI), to enable the transition from geospatial ‘data’ to ‘knowledge’, and
- Provide wholesome workflow solutions enabled by fourth industrial revolution (4IR) technologies.

3

Creation of a Geospatial Industrial Development Fund (GIDF)

Under the aegis of the strategy, the government should create a Geospatial Industrial Development Fund (GIDF) as extra-budgetary funding for advancing the geospatial industry in the country. It is recommended that the GIDF should fund innovations in the domain of geospatial and 4IR, for development of services, solutions and applications, which could be of importance to national projects, sustainability, citizen services, and national development.

4

Improve Process of Project Bids

The Geospatial Industry Development Board should develop mechanisms for National Project Bids that would empower small and mediums enterprises (SMEs); and micro, small, medium-sized enterprises (MSMEs). It is suggested that the Board develops a mechanism for Indian Entities to Bid as Consortium This will enable SMEs and MSMEs to participate in big-ticket projects of the Government of India and empower their capabilities to deliver projects of high-scale and of dynamic geospatial technology architecture.

5

Enhance Local Manufacturing Capabilities

India’s reliance on imports to support its domestic market is significantly high. The India Geospatial Industrial Development Strategy should formalize processes and workflows keeping with the Government of India’s vision of ‘Make in India’, and develop mechanisms to reduce the dependency of the Indian geospatial market on international hardware and software. The government should bring geospatial equipment’s in the ambit of provisions like Production Linked Incentive (PLI) to encourage domestic/localization of manufacturing hardware and software.

6

International Competitiveness

The Geospatial Industrial Development Board should not only work with Indian geospatial entities but also have provisions to work with foreign companies who are willing to expand their business in India. There should be mechanism to strengthen international competitiveness in the country.

7

Public Private Partnerships (PPP)

The Indian Geospatial Industrial Development Strategy should incentivize public-private partnership mechanisms, which should be driven by the Geospatial Industry Development Board. An overarching framework for PPP models should be created to harness the benefits and opportunities of adding a spatial dimension to the economy and the society. The Geospatial Industry Development Board should lead the following initiatives -

- Collaborative efforts should be made between the public and private sector to reduce duplication of data collection.
- Government and private organizations should together decide on data acquisition projects and data collection efforts and subsequently also share data acquisition costs, and
- Provisions should be developed to include data collected by private industry and civil society (crowdsourcing) in the National Data Repository (NDR) and Geoportal by defining an appropriate public-private partnership business model.

8

Geospatial Incubation Centres and Contract R&D

The Indian Geospatial Industrial Development Strategy should highlight specific provisions to establish Geospatial Incubation Centres or Geospatial Industry Accelerators to grow the domestic geospatial industry ecosystem. The Geospatial Industry Development Board should facilitate these provisions in collaboration with National Geospatial Organizations, the private geospatial industry players, user sectors, and civil society to promote open innovation in the country. As part of the strategy, the Board should facilitate long-term Contract R&D to enable the geospatial industry to build next-generation geospatial technologies and also strengthen the geospatial economy of the country.

Apart from the India Geospatial Industrial Development Strategy, the other factors which can have a significant impact on the Indian Geospatial Economy are:

1

Strategic Investment Push to National Geospatial Organizations

A strategic investment push from the Government of India to National Geospatial Organizations, including Survey of India, Indian Space Research Organization, and others is required to –

- Develop an interconnected platform within the data.gov.in platform, wherein geospatial data (inclusive of earth observation data) from different disciplines, formats, and organizations can be integrated in an organized and usable manner.
- Strengthen the government data generating organizations to fulfil their mandate by effectively contributing foundational and thematic data on a regular basis to the national geospatial data platforms.
- Develop a **Resilient PNT infrastructure** based on Indian Regional Navigation Satellite System, duly augmented by Terrestrial PNT systems, to provide stronger and accurate positional information (both 1 meter horizontal and 3 meter vertical as defined in the thresholds) and also provide higher level of resilience at a lower cost.
- Develop a **National Digital Twin strategy** which is geospatially aware and built on a dynamic geospatial infrastructure.

2

Independent and Inter-dependent Sectoral Strategies

An independent sectoral geospatial strategy needs to be developed by sectoral ministries and departments for better utilization of geospatial information for planning and delivery of projects to ensure social and inclusive growth. The sectoral strategies should also be in sync with each other, particularly because the national integrated programs transcend multiple sectors. If one sectoral strategy is restrictive it can have a broader impact on the entire national program.

3

Benchmarks for Technology Implementation

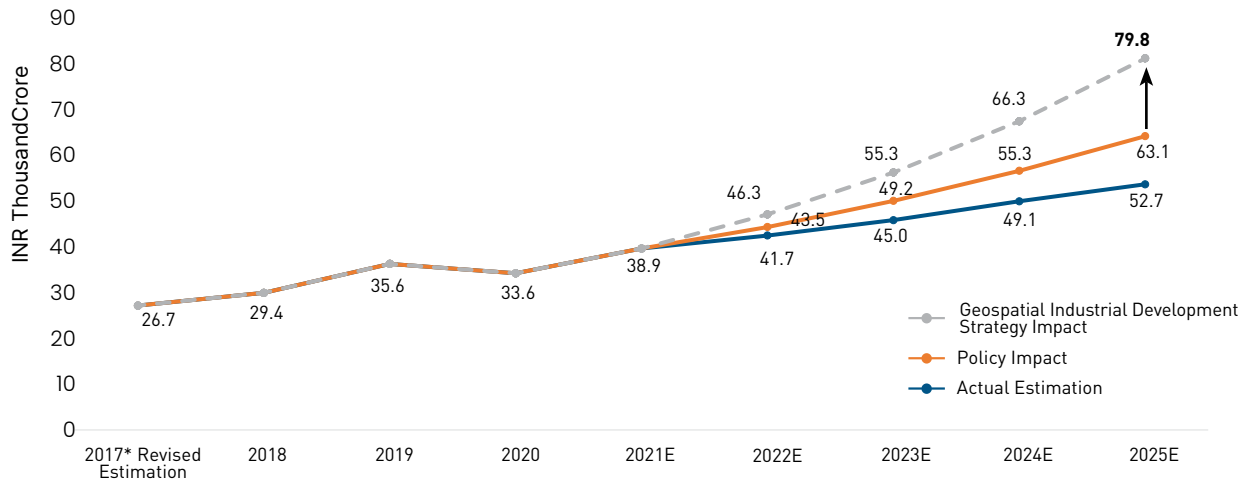
The strategies should outline broader sectoral benchmarks in discussion with the ministries and departments, and the Geospatial Industrial Development Board defining technology and data benchmarks/ thresholds to ensure optimal utilization of the right technology for the right purpose. These benchmarks and thresholds should be in sync with the Draft National Geospatial Policy and the Guidelines for Geospatial Data. These benchmarks can also be used to validate the level of geospatial implementation in a sector. The Government of India should ensure there are technical capabilities to evaluate and certify the completion of the projects.

Indian Geospatial Economy 2021 Projections vis-a-vis 2022 Projections

2021 P- WHAT INDIA'S GEOSPATIAL ECONOMY COULD HAVE BEEN

GRAPH 8

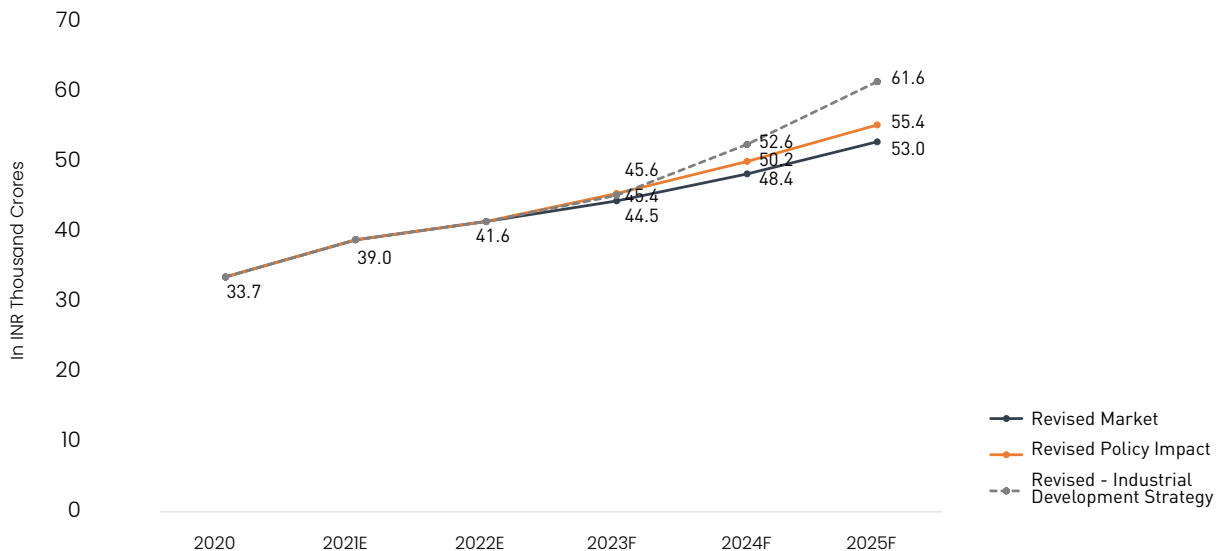
India Geospatial Industrial Development Strategy and its Projected Impact on the Economy (Geospatial Artha 2021)



2022 P -WHAT INDIA'S GEOSPATIAL ECONOMY IS GOING TO BE

GRAPH 9

Indian Geospatial Economy Revised for 2025*
Projected Impact of Policy and the Geospatial Industrial Development Strategy



Source: GW Consulting Analysis

*Corrected for Inflation

Factors to Grow the Indian Geospatial (including Space) Market

The following table summarizes, the research findings of the GW Consulting team on the factors which will drive the Indian geospatial market. These factors have been categorized as input, process and output driven and have been defined through stakeholder engagement. The table summarizes the factors which restricts the Indian geospatial industry to grow (particularly in the domestic market), and the avenues for improvement for the country to foster a geospatial economy worth more than one lakh crore by 2030.

Category	Market Growth Restricting Factors	Avenues for Improvement
Input Driven	Lack of access to sufficient capital	Provide access to grants and funding opportunities
	Lack of access to skilled professionals	<ul style="list-style-type: none"> • Build institutional capacity across national, state, and local level • Establish Geospatial Centres of Excellence (GCoE) • Advance Industry-Academia Engagement and Collaboration
	Centralized Government Process	Develop strategic decentralized decision-making processes to maintain self-sufficiency and long-term viability
Process Driven	Uncertainty and lack of clarity national geospatial and space policy	<ul style="list-style-type: none"> • Formalize policies currently in draft stage [Draft NGP-2021; and Draft Space-based RS -2021] • Build a supportive ecosystem for released Guidelines for Geospatial Data • Conduct policy implementation gap and economic impact analysis yearly
	Bureaucracy/Red Tapism	<ul style="list-style-type: none"> • Establish compliance frameworks and transparent processes and strategies • Improve technology procurement models to Quality-based Selection
	Lack of engagement and encouragement from National Geospatial Agencies	<ul style="list-style-type: none"> • Evolve structural changes within National Geospatial Agencies • Undertake mentoring role to support start-up ecosystem
	Inadequate support to production and manufacturing ecosystems	<ul style="list-style-type: none"> • Provide subsidy-based impetus for developing indigenous production and manufacturing ecosystems • Establish provisions to encourage domestic/localization of manufacturing capabilities
	Lack of Government Support	<ul style="list-style-type: none"> • Provide extra-budgetary funding to foster innovation • Formulate and implement a suitable Industrial Development Strategy • Establish Directives/Laws to check delayed payments (like USA/ EU)
	Restrictive role of National Geospatial Agencies	<ul style="list-style-type: none"> • Evolve the role of national geospatial agencies from passive provider of map/geo data to proactive leadership and facilitator role • Encourage strategic technology and financial investments in National Geospatial Agencies
	Lack of collaborative environment	<ul style="list-style-type: none"> • Encourage public-private partnerships • Foster competitiveness
Output Driven	Inadequate outreach and implementation	<ul style="list-style-type: none"> • Redefine geospatial technology outreach plans • Derive independent and inter-dependent sectoral strategies • Establish benchmarks for geospatial technology implementation
	Poor Business Models	Re-establish business models within the geospatial from a 'product-sell' approach to 'problem-solve' approach
	Insufficient Incubation and Innovation Networks	<ul style="list-style-type: none"> • Establish specific provisions to establish geospatial incubation and innovation centers. • Enable Business Incubators to foster and enable geospatial innovations • Facilitate Long-term Contract R&D for industry's growth

ACKNOWLEDGEMENT

The **Geospatial Strategy for National Development** report has been prepared by Geospatial World with the intent to provide an Indian perspective of the opportunities and challenges associated with the Indian geospatial industry today and tomorrow. The report includes key findings from **Geospatial Artha Report 2022**. I want to express my gratitude to everyone involved in developing this report for sharing their incredible experience, knowledge, virtue, and supervisory guidance in shaping these endeavors.

I want to acknowledge and express my sincere gratitude to all stakeholders who helped prepare this report. I thank the geospatial industry leaders who willingly participated in group interviews (150+ interviews), our online survey participants (800+ respondents), and roundtable discussions to steer this project successfully. Thank you for your kind co-operation and encouragement throughout the study phase and for giving us significant time and attention to produce an empirical research-based report.

Finally, I am pleased to acknowledge the GW Consulting team at Geospatial World, who, over the past six months, collected and conducted a detailed analysis of economic indicators, government policies and regulatory frameworks, budgets of national geospatial organizations; and vital national programs and initiatives, market revenue of 1800+ geospatial companies; impact analysis of released/announced policy, and sectoral guidelines and mandates.

In all humbleness and gratefulness, I am indebted to all in my team who helped develop the foundational data points (quantitative) for this research and helped us deliver a qualitative and quantitative research-based strategy for your perusal. In addition, I am happy to acknowledge the contribution made by the design and visualization team at Geospatial World, and who translated our vision of the report to reality.

Finally, I would like to thank everyone in the Indian geospatial industry ecosystem who have been proactive and shared their thoughts and ideas openly in forums and debates, which has indirectly contributed to the report development. Thank you once again!

Best regards,

Ananyaa Narain

Director – GW Consulting
Geospatial World

GEOSPATIAL ॥ *artha* ॥

INDIAN GEOSPATIAL INDUSTRY OUTLOOK REPORT 2022



Produced by

**GEOSPATIAL
WORLD**
ADVANCING KNOWLEDGE FOR SUSTAINABILITY

For More Details, Contact

ANANYAA NARAIN

Director - GW Consulting, Geospatial World
Email: ananya@geospatialworld.net

ARCHITA SHAKTAWAT

Research Analyst - GW Consulting, Geospatial World
Email: archita@geospatialworld.net



Produced by
**GEOSPATIAL
WORLD**
ADVANCING KNOWLEDGE FOR SUSTAINABILITY